

RESPONSE UNDER 37 C.F.R. § 1.111
U.S. Application No. 10/826,300
Attorney Docket No. Q80724

REMARKS

Reconsideration and allowance of this application are respectfully requested. Claims 1-20 are pending in the application. Applicants thank the Examiner for the indication that claims 6-13 and 17-20 are allowed, and that claims 2-5 and 16 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. However, the rejections are respectfully submitted to be obviated in view of the remarks presented herein.

As a preliminary matter, Applicants respectfully request the Examiner to acknowledge receipt of the certified copy of Korean priority document 10-2003-0024330. In particular, Applicants request the Examiner to acknowledge receipt of *all* certified copies of priority documents in the next office communication.

Rejection of Claims 1, 14 and 15 (Case, Jr. et al.)

Claims 1, 14 and 15 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Case, Jr. et al. (U.S. Patent Number 5,825,350; hereinafter "Case"). The rejection is respectfully traversed.

Regarding independent claim 1, the claimed invention relates to an apparatus for enhancing the accuracy of a sensor signal output from a sensor by estimating and compensating for bias. The apparatus includes a low-pass filter, an operation determination unit, a bias estimating unit and a subtractor. The operation determination unit is operable to determine whether the sensor is not in operation. The bias estimating unit is operable to estimate bias

included in the low frequency sensor signal output from the low-pass filter according to the output of the determination unit. The subtractor is operable to subtract the estimated bias from the low frequency sensor signal according to the output of the operation determination unit.

Turning to the cited art, Case describes a circuit for bias offset determination as shown in Figure 18. A low pass filter (1802) filters a gyroscope output signal. A conventional adder (1804) subtracts an estimate of the gyroscope bias, stored in a latch (1810), from the filtered gyroscope output (column 14, lines 3-8). A differentiator (1806), a window comparator (1808) and a D latch (1810) all together represent a bias estimation section (column 14, lines 8-9). The bias is estimated when the pointing apparatus sensor (100) is assumed to be motionless as ascertained by the comparator (1808) using the angular acceleration calculated by the differentiator (1806) (column 14, lines 9-20).

However, as emphasized by the present application in paragraphs [04] and [05], Case's apparatus only uses a single large-sized window comparator and is not operable to compensate for bias even when the sensor is not in operation. Furthermore, Case's apparatus has a fixed dead zone and a predetermined part of a sensor signal is regarded as a noise which causes signal loss, leading to an faulty sensor.

Applicants respectfully submit that the claimed invention is not anticipated by or rendered obvious in view of the disclosure of Case. Case fails to teach or suggest, in particular, "an operation determination unit operable to determine whether the sensor (100) is not in operation," as recited in claim 1. Although the Examiner suggests that Case's window

comparator (1808) is an operation determination unit, the window comparator (1808) only determines whether or not the differentiated signal is included within a window of a predetermined size, and does not determine whether the sensor is not in operation. The determination of a signal to be within a window is independent of any determination made as to the operational state of the sensor (100), because the window comparator (1808) only determines the whether the angular acceleration calculated by differentiator (1806) falls in and out of the window. The determination made by the window comparator (1808) does not relate to whether the sensor is or is not in operation, such that the calculated angular acceleration may fall out of the window even when the sensor is in operation. Therefore, the window comparator (1808) is not capable of determining the operational state of the sensor (100), and only determines the angular motion acceleration of the sensor (100) when the sensor (100) is in operation.

Furthermore, Case also fails to teach or suggest a bias estimating unit which estimates bias according to the output of the determination unit. Case's bias estimation section includes each of the components of the differentiator (1806), the window comparator (1808) and the D latch (1810) (column 14, lines 8-9). The Examiner has attempted to consider the window comparator (1808) to be both an operation determining unit as well as part of a bias estimating unit, but because the window comparator (1808) is actually a part of Case's bias estimating section, Case's bias estimation section is not operable to estimate bias according to the output of the comparator (1808).

Therefore, Case's window comparator (1808) does not determine whether the sensor is not in operation, nor does Case's bias estimation section (1806, 1808 and 1810) estimate bias

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according to an output of an operation determining unit operable to determine whether the sensor is not in operation. *Instead, Case's window comparator (1808) is only capable of ascertaining whether an angular acceleration calculated by the differentiator (1806) remains within a specified window, which does not relate to any detection as to whether or not the sensor (100) is in operation, nor can a conclusion of operational state of the sensor (100) be made from the determination of the window comparator (1808).* At least by virtue of the aforementioned differences, the invention defined by claim 1 is distinguished over Case. Independent claim 14 is a related method claim, and is distinguished over Case for analogous reasons. Claim 15 is a dependent claim including all of the elements of independent claim 14, which as established above, is distinguished over Case. Therefore, claim 15 should be allowable over Case for at least the aforementioned reasons as well as for its additionally recited features. Reconsideration and withdrawal of the rejection under 35 U.S.C. § 102(b) are respectfully requested.

With further regard to claim 15, the determination as to whether or not the sensor is not in operation includes "differentiating the low frequency sensor signal; and ... determining that the sensor is not operating when an amplitude of the differentiated, low frequency signal is a first value or less, and an amplitude of the low frequency sensor signal is a second value or less." Case fails to anticipate or render obvious these claimed elements. As described above, Case's window comparator (1808) is only capable of ascertaining whether an angular acceleration calculated by the differentiator (1806) remains within a specified window, with no relation as to whether or not the sensor (100) is in operation. Case's window comparator (1808) determines whether the signal output from the differentiator (1806) is within a specified window, however,

the angular acceleration within the specified window is not taught or suggested to be an amplitude of “a first value of less.” Further, Case does not determine whether an amplitude of the signal output from the low pass filter (1802) “is a second value or less.” Additionally, Case does not make any determination of whether the sensor is not operating based on amplitude values of both a differentiated low frequency sensor signal and a low frequency sensor signal. At least by virtue of these additional differences as well as for the aforementioned reasons, the claimed invention is distinguished over Case.

Rejection of Claims 1, 14 and 15 (Applicants’ Prior Art Figure 1)

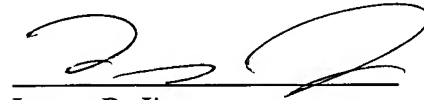
Claims 1, 14 and 15 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Applicants’ prior art submitted in figure 1. The claimed invention should be allowable over the cited prior art for the same reasons as discussed above. Applicants’ submitted Figure 1 depicts a block diagram of a bias compensating apparatus as disclosed in Case (paragraph [04]). As discussed above, the bias compensating apparatus of the prior art fails to teach or suggest the claimed invention. Therefore, claims 1, 14 and 15 should also be allowable over prior art Figure 1. Reconsideration and withdrawal of the rejection under 35 U.S.C. § 102(b) are respectfully requested.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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Respectfully submitted,



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